

## Claims

What is claimed is:

1. A system for enforcing data integrity during editing of a multi-dimensional data store comprising:
  - a server facility further comprising an application program, and a multi-dimensional data store in the form of a Planning Data Repository with an associated Calculation Engine;
  - a client computer further comprising an application having the ability to show data derived from said database, and to request changes to the data to be made at said database; and
  - a network interconnecting the server and the client.
2. The system of claim 1 wherein the Calculation Engine and Planning Data Repository ensure consistency and validity of changes in the data requested by the client application.
3. The system of claim 2 wherein the client application includes the ability to window over more data than is physically displayed.
4. The system of claim 3 wherein the calculation engine and Planning Data Repository are able to reverse previous changes completely – an Undo function.
5. The system of claim 4 wherein the data are displayed with dimensions derived from metadata sent by the server and the planning data repository.
6. The system of claim 1 wherein only changes to the data are transferred from the server to the client.
7. The system of claim 1 wherein, following the receipt by the client of the possible formulae to be used in the calculations, the client signals to the server which of the said formulae are to be used.

FOOTNOTES

8. The system of claim 7 where the client is permitted to edit said formulae and replace them with new formulae if required.
9. The system of claim 8 where the data are displayed in a fashion that simulates a standalone spreadsheet program.
10. The system of claim 9 wherein the network is the Internet or World Wide Web, and the Client software application is a standard Internet or Web Browser supporting JavaScript.
11. A method of enforcing data integrity during editing of a multi-dimensional data store in a system with a Planning Data Repository, a Calculation Engine, a Server and, a Client computer containing a Browser application, all interacting over one or more networks, the method comprising the steps of:
  - a. providing a spreadsheet-like display containing data for use by said method;
  - b. the Browser obtaining data from the Planning Data Repository;
  - c. in response to a user action, the Browser sending a "Request Calculate" to the Server;
  - d. the Server obtaining from the Calculation Engine the result of the calculation;
  - e. the Server passing the result received from the Calculation Engine to the Browser;
  - f. the Browser displaying the results of the changes;
  - g. in response to a user action, the Browser sending a "Request Save" to the Server; and
  - h. the Browser receiving an Acknowledgement of a successful Save.

12. The method of claim 11 wherein the step of the Browser obtaining data from the Planning Data Repository comprises the following steps:

- a. the Browser requesting data from the Server;
- b. the Server requesting the data from the Planning Data Repository;
- c. the Planning Data Repository responding to the request of step c from the Server with the data and metadata;
- d. the Server reformatting the data and metadata; and
- e. the Server responding to the request of step b with the data and metadata.

13. The method of claim 11 wherein the step of the Server obtaining from the Calculation Engine the result of the calculation comprises the following steps:

- a. the Server forwarding the "Request Calculate" message including changed data to a Calculation Engine;
- b. the Calculation Engine performing a series of Requests for data from the Planning Data Repository;
- c. the Calculation Engine performing the required calculations using the changed data and the data requested from the Planning Data Repository;
- d. the Calculation Engine ensuring that the appropriate data is compatible with the data and rules pertaining to the data as contained in the Planning Data Repository; and
- e. the Calculation Engine forwarding the result of the calculation to the Server.

14. The method of claim 11 wherein, following the step of in response to a user action, the Browser sending a "Request Save" to the Server, the following steps take place:

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- a. the Server forwarding the "Request Save" message including changed data to a Calculation Engine;
- b. the Calculation Engine updating the Planning Data Repository with data changed as a result of the Request Calculation; and
- c. the Calculation Engine sending an "Acknowledge" message to the Server confirming successful completion of the "Request Save".

15. A method of enforcing data integrity during editing of a multi-dimensional data store in a system with a Planning Data Repository, a Calculation Engine, a Server and, a Client computer containing a Browser application, all interacting over one or more networks, the method comprising the steps of:

- a. providing a spreadsheet-like display containing data for use by said method;
- b. the Browser requesting data from the Server;
- c. the Server requesting the data from the Planning Data Repository;
- d. the Planning Data Repository responding to the request of step c from the Server with the data and metadata;
- e. the Server reformatting the data and metadata;
- f. the Server responding to the request of step b with the data and metadata;
- g. in response to a user action, the Browser sending a "Request Calculate" to the Server;
- h. the Server forwarding the "Request Calculate" message including changed data to a Calculation Engine;
- i. the Calculation Engine performing a series of Requests for data from the Planning Data Repository;

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- j. the Calculation Engine performing the required calculations using the changed data and the data requested from the Planning Data Repository;
- k. the Calculation Engine ensuring that the appropriate data is compatible with the data and rules pertaining to the data as contained in the Planning Data Repository;
- l. the Calculation Engine forwarding the result of the calculation to the Server;
- m. the Server passing the result received from the Calculation Engine to the Browser in the format required;
- n. the Browser displaying the effect of the changes resulting from the Calculation Engine implementing the "Request Calculation" message;
- o. in response to a user action, the Browser sending a "Request Save" to the Server;
- p. the Server forwarding the "Request Save" message including changed data to a Calculation Engine;
- q. the Calculation Engine updating the Planning Data Repository with data changed as a result of the Request Calculation;
- r. the Calculation Engine sending an "Acknowledge" message to the Server confirming successful completion of the "Request Save"; and
- s. the Server forwarding the Acknowledgement of successful completion to the Browser.

16. The method of claim 15 wherein the Planning Data Repository is distributed over a number of computers interconnected by a network.

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